IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **TAUBER et. al**
Parent Application Serial No.: **09/845,108**
Parent Application Filed: **April 26, 2001**
Attorney Docket No.: **CECOM 5523**
For: **RARE EARTH METAL COMPOUNDS FOR USE IN HIGH CRITICAL TEMPERATURE JOSEPHSON JUNCTIONS**

PRELIMINARY AMENDMENT

AMENDMENTS TO THE CLAIMS

Sir:

In accordance with the enclosed Remarks and the Revised Amendment Format, please amend the claims in the above-identified application as follows:

1. (Withdrawn) Dielectric substrates of the general formula Sr_2RESbO_6 where RE is a rare earth metal selected from the group consisting of Lutetium, Ytterbium, Thulium, Erbium, Holmium, Dysprosium, Yttrium, Lanthanum, Gadolinium, Samarium, Praseodymium, Europium, Neodymium and Terbium.

2. (Withdrawn) The dielectric substrates, as recited in claim 1, further comprising:

said dielectric substrates being heated for at least 20 hours at between 1400° C and 1600 ° C;

said dielectric substrates having a low dielectric constant in the range of 4.1 to 16.3;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 $Å^3$; and

said dielectric substrates having a low dielectric loss in the range of less than 1×10^{-3} to 9×10^{-3} without a phase transition.

3. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of

Sr_2LuSbO_6.

4. (Withdrawn) The dielectric substrate, according to claim 3, wherein:
said dielectric substrate is constructed in a bulk form;
said dielectric substrate having a low dielectric constant of 15.1; and
said dielectric substrate having a low dielectric loss of less than 1×10^{-3}.

5. (Withdrawn) The dielectric substrate, according to claim 3, wherein:
said dielectric substrate is constructed in a thin film structure;
said dielectric substrate having a density GM/CC of 6.87;
said dielectric substrate having a low dielectric constant between 14.3 and 15.9; and
said dielectric substrate having a low dielectric loss less than 1×10^{-3}.

6. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2YbSbO_6.

7. (Withdrawn) The dielectric substrate, according to claim 6, wherein:
said dielectric substrate is constructed in a bulk form;
said dielectric substrate having a low dielectric constant of 5.1; and
said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

8. (Withdrawn) The dielectric substrate, according to claim 6, wherein:
said dielectric substrate is constructed in a thin film structure;
said dielectric substrate having a density GM/CC of 6.86;
said dielectric substrate having a low dielectric constant between 4.8 and 5.4; and
said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

9. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2TmSbO_6.

10. (Withdrawn) The dielectric substrate, according to claim 9, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 10.0; and

said dielectric substrate having a low dielectric loss of 2.0×10^{-3}.

11. (Withdrawn) The dielectric substrate, according to claim 9, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrates having a density GM/CC of 6.77;

said dielectric substrate having a low dielectric constant between 9.5 and 10.5; and

said dielectric substrate having a low dielectric loss of 2.0×10^{-3}.

12. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2ErSbO_6.

13. (Withdrawn) The dielectric substrate, according to claim 12, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 5.3; and

said dielectric substrate having a low dielectric loss of 1.6×10^{-3}.

14. (Withdrawn) The dielectric substrate according to claim 12 wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 4.1; and

said dielectric substrate having a low dielectric loss of 3.2×10^{-3}.

15. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2HoSbO_6.

16. (Withdrawn) The dielectric substrate, according to claim 15, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 11.6; and

said dielectric substrate having a low dielectric loss of about 3.1×10^{-3}.

17. (Withdrawn) The dielectric substrate, according to claim 15, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrates having a density GM/CC of 6.64;

said dielectric substrate having a low dielectric constant between 11.1 and 12.2; and

said dielectric substrate having a low dielectric loss of 3.1×10^{-3}.

18. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2DySbO_6.

19. (Withdrawn) The dielectric substrate, according to claim 18, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 11.2; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

20. (Withdrawn) The dielectric substrate, according to claim 18, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 6.56;

said dielectric substrate having a low dielectric constant between 10.6 and 11.8; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

21. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2TbSbO_6.

22. (Withdrawn) The dielectric substrate, according to claim 21, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 12.9; and

said dielectric substrate having a low dielectric loss of 1.4×10^{-3}.

23. (Withdrawn) The dielectric substrate, according to claim 21, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 4.6; and

said dielectric substrate having a low dielectric loss of 4.0×10^{-3}.

24. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2YSbO_6.

25. (Withdrawn) The dielectric substrate, according to claim 24, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 7.1; and

said dielectric substrate having a low dielectric loss of 1.4×10^{-3}.

26. (Withdrawn) The dielectric substrate, according to claim 24, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 5.91;

said dielectric substrate having a low dielectric constant between 6.7 and 7.5; and

said dielectric substrate having a low dielectric loss of about 1.4×10^{-3}.

27. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2LaSbO_6.

28. (Withdrawn) The dielectric substrate, according to claim 27, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 16.3; and

said dielectric substrate having a low dielectric loss of 3.8×10^{-3}.

29. (Withdrawn) The dielectric substrate according to claim 27 wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 5.19.

said dielectric substrate having a low dielectric constant between 14.5 and 16.1; and

said dielectric substrate having a low dielectric loss of about 3.8×10^{-3}.

30. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2GdSbO_6.

31. (Withdrawn) The dielectric substrate, according to claim 30, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 12.1; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

32. (Withdrawn) The dielectric substrate, according to claim 30, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 6.0; and

said dielectric substrate having a low dielectric loss of 9.0×10^{-3}.

33. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2SmSbO_6.

34. (Withdrawn) The dielectric substrate, according to claim 33, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 13.6; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

35. (Withdrawn) The dielectric substrate, according to claim 33, wherein:

said dielectric substrate is constructed in a thin film structure;
said dielectric substrate having a low dielectric constant of 8.8; and
said dielectric substrate having a low dielectric loss of 9.0×10^{-3}.

36. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2PrSbO_6.

37. (Withdrawn) The dielectric substrate, according to claim 36, wherein:
said dielectric substrate is constructed in a bulk form;
said dielectric substrate having a low dielectric constant of 10.9; and
said dielectric substrate having a low dielectric loss of 2.2×10^{-3}.

38. (Withdrawn) The dielectric substrate, according to claim 36, wherein:
said dielectric substrate is constructed in a thin film structure;
said dielectric substrates having a density GM/CC of 6.02;
said dielectric substrate having a low dielectric constant between 10.4 and 11.4; and
said dielectric substrate having a low dielectric loss of about 2.2×10^{-3}.

39. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2EuSbO_6.

40. (Withdrawn) The dielectric substrate, according to claim 39, wherein:
said dielectric substrate is constructed in a bulk form;
said dielectric substrate having a low dielectric constant of 14.6; and
said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3}.

41. (Withdrawn) The dielectric substrate, according to claim 39, wherein:
said dielectric substrate is constructed in a thin film structure;
said dielectric substrate having a low dielectric constant of 4.6; and

said dielectric substrate having a low dielectric loss of 2.0×10^{-3}.

42. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of Sr_2NdSbO_6.

43. (Withdrawn) The dielectric substrate, according to claim 42, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 10.6; and

said dielectric substrate having a low dielectric loss of 2.9×10^{-3}.

44. (Withdrawn) The dielectric substrate, according to claim 42, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 6.13;

said dielectric substrate having a low dielectric constant between 10.1 and 11.1; and

said dielectric substrate having a low dielectric loss of about 2.9×10^{-3}.

45. (Withdrawn) A thin film high T_c structure, comprising:

a plurality of thin films constructed of a compound of the general formula Sr_2RESbO_6 wherein RE is a rare earth metal;

said plurality of thin films being interspersed with a plurality of layers constructed of a copper oxide superconductor;

said plurality of thin films being deposited by pulsed laser deposition and being heated for at least 20 hours at between 750° C to 825° C;

said plurality of thin films having a low dielectric constant;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 $Å^3$; and

said plurality of thin films having a low dielectric loss without a phase transition.

46. (Withdrawn) A thin film high critical temperature superconductor structure,

according to claim 45, further comprising:

said plurality of thin films are constructed of Sr_2LuSbO_6;

said plurality of thin films being heated for at least 20 hours at between 750° C to 825° C; and

said plurality of layers are constructed of $YBa_2Cu_3O_{7-\delta}$.

47. (Withdrawn) A thin film high critical temperature superconductor structure, according to claim 45, further comprising:

said plurality of thin films are constructed of Sr_2LaSbO_6; and

said plurality of layers are constructed of $YBa_2Cu_3O_{7-\delta}$.

48. (Withdrawn) An antenna, comprising:

a single layer of a copper oxide superconductor deposited onto a single crystal substrate of the formula Sr_2LuSbO_6;

said single crystal substrate having a low dielectric constant;

said single crystal substrate having a low dielectric loss without a phase transition;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 $Å^3$; and

said single layer of a copper oxide superconductor being patterned to complete the device.

49. (Currently Amended) A superconductor insulator superconductor step edge Josephson junction, comprising:

a single layer of a copper oxide superconductor deposited onto a single crystal substrate of the formula Sr_2YbSbO_6;

said single crystal substrate being heated for at least 20 hours at between 1400° C and 1600 ° C;

said single crystal substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said single crystal substrate having a low dielectric constant between 4.8 and 5.4;

said single crystal substrate having a low dielectric loss of less than 1.0×10^{-3} without a

phase transition;

said single crystal substrate having a density GM/CC of 6.86;

said single layer of ~~a~~ the copper oxide superconductor being patterned;

a second layer of Sr_2YbSbO_6 deposited onto said single layer of ~~a~~ the copper oxide superconductor;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 $Å^3$; and

a second layer of ~~a~~ the copper oxide superconductor deposited and patterned on said second layer of Sr_2YbSbO_6.

50. (Withdrawn) Buffer layers of the general formula Sr_2RESbO_6 where RE is a rare earth metal selected from the group consisting of Lutetium, Ytterbium, Thulium, Erbium, Holmium, Dysprosium, Yttrium, Lanthanum, Gadolinium, Samarium, Praseodymium, Europium, Neodymium and Terbium.

51. (Withdrawn) The buffer layers, according to claim 50, further comprising:

said buffer layers are constructed in a thin film structure;

said buffer layers having a low dielectric constant in the range of 4.8 to 16.1;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 $Å^3$; and

said buffer layers having a low dielectric loss in the range of less than to 1×10^{-3} to 9×10^{-3} without a phase transition.

52. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2YbSbO_6.

53. (Withdrawn) The buffer layer according to claim 52, wherein:

said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 6.86;

said buffer layer having a low dielectric constant between 4.8 and 5.4; and

said buffer layer having a low dielectric loss of less than 1 x 10^{-3}.

54. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2TmSbO_6.

55. (Withdrawn) The buffer layer, according to claim 54, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of 6.77;
said buffer layer having a low dielectric constant between 9.5 and 10.5; and
said buffer layer having a low dielectric loss of about 2.0 x 10^{-3}.

56. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2ErSbO_6.

57. (Withdrawn) The buffer layer, according to claim 56, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a low dielectric constant of 4.1; and
said buffer layer having a low dielectric loss of 3.2 x 10^{-3}.

58. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2HoSbO_6.

59. (Withdrawn) The buffer layer, according to claim 58, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of 6.64;
said buffer layer having a low dielectric constant between 11.1 and 12.2; and
said buffer layer having a low dielectric loss of 3.1 x 10^{-3}.

60. (Withdrawn) The buffer layer, according to claim 51, being constructed of

Sr_2DySbO_6.

61. (Withdrawn) The buffer layer, according to claim 60, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of 6.56;
said buffer layer having a low dielectric constant between 10.6 and 11.8; and
said buffer layer having a low dielectric loss of less than 1.0×10^{-3}.

62. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2TbSbO_6.

63. (Withdrawn) The buffer layer, according to claim 62, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a low dielectric constant of 4.6; and
said buffer layer having a low dielectric loss of 1.4×10^{-3}.

64. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2YSbO_6.

65. (Withdrawn) The buffer layer according to claim 64, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of 6.56;
said buffer layer having a low dielectric constant between 6.7 and 7.5; and
said buffer layer having a low dielectric loss of about 1.4×10^{-3}.

66. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2LaSbO_6.

67. (Withdrawn) The buffer layer, according to claim 66, wherein:
said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 5.19;

said buffer layer having a low dielectric constant between 14.5 and 16.1; and

said buffer layer having a low dielectric loss of about 3.8×10^{-3}.

68. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2GdSbO_6.

69. (Withdrawn) The buffer layer, according to claim 68, wherein:

said buffer layer is constructed in a thin film structure;

said buffer layer having a low dielectric constant of 6.0; and

said buffer layer having a low dielectric loss of 9.0×10^{-3}.

70. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2SmSbO_6.

71. (Withdrawn) The buffer layer, according to claim 70, wherein:

said buffer layer is constructed in a thin film structure;

said buffer layer having a low dielectric constant of 8.8; and

said buffer layer having a low dielectric loss of 9.0×10^{-3}.

72. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2PrSbO_6.

73. (Withdrawn) The buffer layer, according to claim 72, wherein:

said buffer layer is constructed in a thin film structure;

said buffer layers having a density GM/CC of 6.02;

said buffer layer having a low dielectric constant between 10.4 and 11.4; and

said buffer layer having a low dielectric loss of about 2.2×10^{-3}.

74. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2EuSbO_6.

75. (Withdrawn) The buffer layer, according to claim 74, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a low dielectric constant of 4.6; and
said buffer layer having a low dielectric loss of 2.0×10^{-3}.

76. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2NdSbO_6.

77. (Withdrawn) The buffer layer, according to claim 76, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of 6.13;
said buffer layer having a low dielectric constant between 10.1 and 11.1; and
said buffer layer having a low dielectric loss of about 2.9×10^{-3}.

78. (Withdrawn) The buffer layer, according to claim 51, being constructed of Sr_2LuSbO_6.

79. (Withdrawn) The buffer layer, according to claim 78, wherein:
said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of 6.87;
said buffer layer having a low dielectric constant between 14.3 and 15.9; and
said buffer layer having a low dielectric loss constant of less than 1×10^{-3}.

80. (New) The superconductor insulator superconductor step edge Josephson junction, as recited in claim 49, further comprising said single layer of the copper oxide superconductor being patterned by ion milling.

81. (New) The superconductor insulator superconductor step edge Josephson junction, as recited in claim 80, further comprising said single layer of the copper oxide superconductor being patterned by ion milling at a 45° angle.

82. (New) A superconductor insulator superconductor step edge Josephson junction, comprising:

a single layer of a copper oxide superconductor deposited onto a substrate;

said substrate having a buffered layer with the formula Sr_2YbSbO_6;

said buffered layer being heated for at least 20 hours at between 1400° C and 1600 ° C;

said buffered layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said buffered layer having a low dielectric constant between 4.8 and 5.4;

said buffered layer having a low dielectric loss of less than 1.0×10^{-3} without a phase transition;

said buffered layer having a density GM/CC of 6.86;

said single layer of the copper oxide superconductor being patterned;

a second layer of Sr_2YbSbO_6 deposited onto said single layer of the copper oxide superconductor;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 $Å^3$; and

a second layer of the copper oxide superconductor deposited and patterned on said second layer of Sr_2YbSbO_6.

83. (New) The superconductor insulator superconductor step edge Josephson junction, as recited in claim 82, further comprising said single layer of the copper oxide superconductor being patterned by ion milling.

84. (New) The superconductor insulator superconductor step edge Josephson junction, as recited in claim 83, further comprising said single layer of the copper oxide superconductor being

patterned by ion milling at a 45° angle.

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